Concussion assessment in cycling: a systematic review and call to action

BOOK OF ABSTRACTS **Open Access**

Concussion assessment in cycling: a systematic review and call to action

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Purpose:
Concussion is a recognised risk in road cycling and can have serious health consequences[1], especially when mismanaged. Epidemiological studies estimate that concussions account for 4-13% of all cycling injuries[2-4] and that the incidence of concussions is increasing[5]. The high-profile case of Toms Skujins in the 2017 Tour of California, who was initially allowed to continue riding despite demonstrating obvious ataxia following a crash, highlighted the lack of a concussion assessment protocol in road cycling. Aim: a systematic review of the literature on concussion assessment in cycling.

Methods:
literature describing concussion assessment in cycling was identified by searching MEDLINE, EMBASE, PsycINFO & Web of Science. Two reviewers independently screened titles and abstracts for eligibility. Figure 1 demonstrates the flow diagram of reviewed and included studies. A qualitative analysis was undertaken of included studies.

Results:
From 94 studies identified, 2 were included for review. Gordon et al. 2013[6] describe the presentation of a single case of paediatric concussion following a cycling crash and highlights the utility of evaluation using the Sport Concussion Assessment Tool[7] (SCAT5) as well as the importance of a stepwise return-to-play protocol. Greve & Modabber 2012[8] discuss a number of traumatic brain injuries that occurred during the 2011 road cycling season and, as a minimum, calls for riders to be withdrawn from riding following loss of consciousness or amnesia.

Discussion:
Road cycling poses a unique challenge for the assessment of concussion and we have found there is little published evidence to advise effective means of in-race assessment. Following a potentially concussive impact, the decision to allow a rider to continue or not, must be made quickly and in sub-optimal conditions. Indeed it is not possible to temporarily withdraw a rider for a 'sideline assessment'. Moreover medical personnel are often unable to observe the rider directly and rely on radio communication for assessment.

The recent Berlin Consensus Statement on Concussion in Sport[9] states that "*Adequate facilities should be provided for the appropriate medical assessment both on and off the field for all injured athletes. In some sports, this may require rule changes to allow an appropriate off-field medical assessment to occur without affecting the flow of the game or unduly penalising the injured player's team.*" Action must be taken to increase adherence to the Berlin Consensus statement within cycling. Whilst the UCI Cycling Regulations[10] discuss multi-modal assessment in suspected concussion and the need for immediate withdrawal from competition/training if concussion is suspected, no internationally-agreed assessment protocol for concussion in road cycling has been published. The UCI regulations advise the use of SCAT5 for concussion assessment but this tool is impractical to use in-competition and would require modifications for use in road cycling, particularly for in-competition assessments.

Abramson et al. of USA Cycling/MedicineofCycling.com have produced a concussions in cycling consensus statement[11] but with limited race-specific assessment instructions and the statement has not been published in a peer-reviewed journal.

Conclusion:
We would like to call on the UCI to hold a consensus meeting to establish an evidence-based concussion assessment protocol and return-to-riding protocol for road cycling. These protocols would need to be multi-lingual and should consider the role of both medical and non-medical personnel, e.g. neutral mechanics, who may be the first responder following a crash.

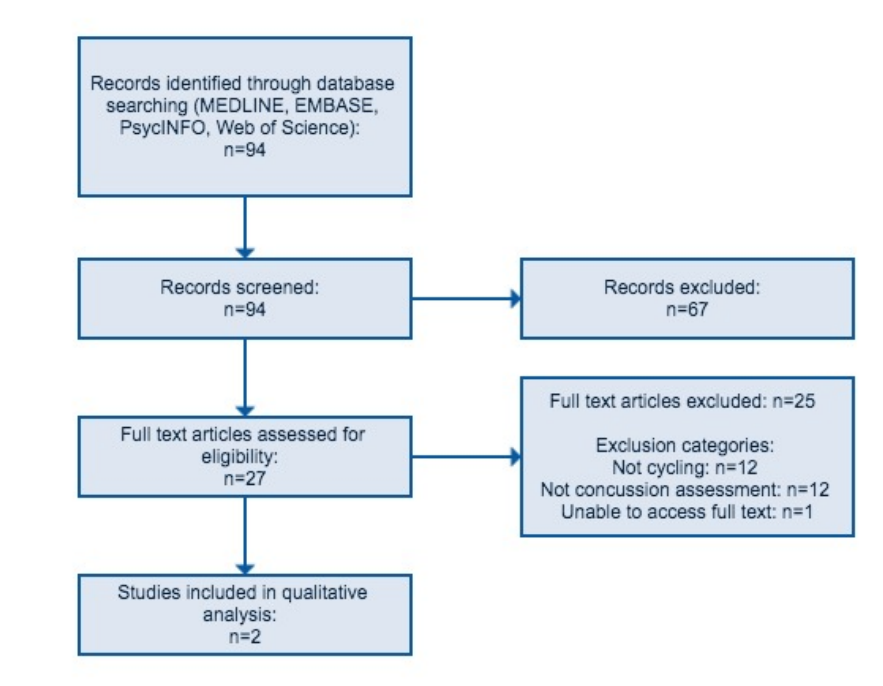

Figure 1. Flow diagram of reviewed and included studies

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